

I claim:

1. An apparatus for plating and polishing a surface of a semiconductor workpiece, comprising:

a first chamber having a plating device for plating the surface of the workpiece;

5 a second chamber having a polishing device for polishing the surface of the workpiece; and

a partition separating the first chamber from the second chamber.

2. The apparatus according to claim 1, wherein the plating device comprises a pad mounted on a cylindrical anode.

10 3. The apparatus according to claim 2, wherein the cylindrical anode is adapted to rotate about a first axis.

4. The apparatus according to claim 1, wherein the plating device comprises an anode plate mounted in proximity to a bottom side of the first chamber.

15 5. The apparatus according to claim 1, wherein the polishing device comprises a pad mounted on a cylindrical anode.

6. The apparatus according to claim 5, wherein the cylindrical anode is adapted to rotate about a first axis.

7. The apparatus according to claim 1, wherein the polishing device comprises a chemical mechanical polishing device.

20 8. The apparatus according to claim 7, wherein the chemical mechanical polishing device comprises a pad mounted on a cylindrical roller.

9. The apparatus according to claim 8, wherein the cylindrical roller is adapted to rotate about a first axis.

10. The apparatus according to claim 1 further comprising an electrolyte solution disposed in the first and second chambers.

11. The apparatus according to claim 1 further comprising a workpiece support adapted to support the workpiece during plating and polishing, wherein the 5 workpiece support is adapted to rotate about a second axis and adapted to move from side to side.

12. The apparatus according to claim 1, wherein the workpiece comprises one of a wafer, a flat panel, and a magnetic film head.

13. A method of plating and polishing a surface of a semiconductor 10 workpiece, the method comprising the steps of:

plating a conductive material to the surface of the workpiece using an electrolyte solution disposed on the surface of the workpiece, the workpiece being disposed in proximity to an anode; and

15. polishing the surface of the workpiece during at least certain of the times when the plating is not being performed.

14. A method according to claim 13, wherein the plating step is performed in a first chamber and the polishing step is performed in a second chamber.

15. A method according to claim 14, wherein the first chamber and the second chamber are separated by a partition.

20 16. A method according to claim 13, wherein the plating step is performed using one of a brush plating and an electro chemical mechanical deposition.

17. A method according to claim 13, wherein the polishing step is performed using one of an electropolishing and a chemical mechanical polishing.

18. A method according to claim 13, wherein the plating step is performed before the polishing step.

19. A method according to claim 13, wherein the workpiece comprises one of a wafer, a flat panel, and a magnetic film head.

5 20. A pad assembly for plating and polishing a semiconductor workpiece, comprising:

a cylindrical anode having an outer surface; and

10 a plurality of pad strips mounted on the cylindrical anode such that the plurality of pad strips protrude from the outer surface of the cylindrical anode.

21. The pad assembly according to claim 20, wherein the cylindrical anode is adapted to rotate about a first axis.

22. The pad assembly according to claim 20, wherein plating is performed when the pad strips are not in contact with the workpiece, and polishing is performed when the pad strips are in contact with the workpiece.

15 23. The pad assembly according to claim 20, wherein the workpiece comprises one of a wafer, a flat panel, and a magnetic film head.

24. A pad assembly for plating and polishing a semiconductor workpiece, comprising:

a circular or donut shaped anode having a top surface; and

20 a plurality of pad strips mounted on the top surface of the anode such that the plurality of pad strips protrude from the top surface of the anode.

25. The pad assembly according to claim 24, wherein the anode is adapted to rotate about a first axis.

26. The pad assembly according to claim 24, wherein plating is performed when the pad strips are not in contact with the workpiece, and polishing is performed when the pad strips are in contact with the workpiece.

27. The pad assembly according to claim 24, wherein the workpiece 5 comprises one of a wafer, a flat panel, and a magnetic film head.

28. A method of depositing a conductive material from an electrolyte solution to a predetermined area of a workpiece comprising the steps of:

10 intermittently applying the conductive material to the workpiece using the electrolyte solution disposed on a surface of the workpiece, the workpiece being disposed in proximity to an anode; and

polishing the workpiece during at least certain of the times when the intermittent application is not being performed.

29. A method according to claim 28, wherein the workpiece comprises one of a wafer, a flat panel, and a magnetic film.

15 30. An anode assembly for plating a semiconductor workpiece, comprising: an anode having an outer surface; and a plurality of pad strips or fixed features attached on the anode such that the plurality of pad strips protrude from the outer surface of the anode.

20 31. The pad assembly according to claim 30, wherein the anode is adapted to rotate about a first axis.

32. The pad assembly according to claim 30, wherein plating is performed when the pad strips or fixed features are in proximity to the workpiece.

33. The pad assembly according to claim 32, wherein the pad strips or fixed

features are within 0-5 mm from the workpiece.

34. A method of plating a conductive material from an electrolyte solution to a surface of a workpiece comprising the steps of:

continuously applying the electrolyte solution on the surface of the workpiece, the  
5 electrolyte solution being applied to the surface using an anode rotating about a first axis  
while generating a closed electrical circuit between the anode and the workpiece; and  
providing an electric potential between the anode and the workpiece.

35. A method according to claim 34, wherein the anode includes an outer  
surface having a plurality of pad strips or fixed features attached thereon.

10 36. A method according to claim 35, wherein the continuously applying step  
further includes the step of splashing or agitating the electrolyte solution near the surface  
using the plurality of pad strips or fixed features.

37. A method according to claim 35, wherein the plurality of pad strips or  
fixed features are in close proximity to the surface of the workpiece.

15 38. A method of depositing a conductive material from an electrolyte solution  
to a predetermined area of a workpiece containing a seed layer disposed thereon  
comprising the steps of:

applying said conductive material over said seed layer of said workpiece using  
said electrolyte solution disposed on a surface of said workpiece, said workpiece being  
20 disposed in proximity to an anode; and

mechanically polishing said workpiece during at least certain of the times when  
said application is being performed, thereby altering the texture of the conductive  
material being applied

39. A method according to claim 38, wherein the texture of the conductive material being applied becomes more random.